

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : Unknown
Applicant : Friedrich BOECKING
Filed : June 8, 2005
Based on : PCT/EP 2004/050785
Title : Fuel Injector For Internal Combustion Engines

Docket No. : R.304748
Customer No. : 02119

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Date: June 8, 2005

**INFORMATION DISCLOSURE STATEMENT UNDER 37 CFR 1.97(b),
AND EXPLANATION OF THE RELEVANCE OF THE CITED PRIOR ART**

Sir:

The undersigned hereby requests that the prior art cited on the attached prior art statement be placed of record in the application file and be considered by the examiner.

This citation of prior art is made under 37 CFR 1.97(b), since it is being filed within three months of the filing date and before the mailing of a first Office action.

The relevance of the prior art cited on the attached form PTO/SB/08a is as follows:

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US 2003/0052203 A1

This patent application teaches a fuel injector valve for fuel injection systems of internal combustion engines. The valve is comprised of an actuator which cooperates with a valve needle (34, 51, 73). A first valve closure member (35, 52) is arranged on the valve needle (34, 51, 73). This valve closure member cooperates with a first valve seat surface (33, 53) on a valve body (32, 50) forming a first sealing seat (36, 54). A second valve closure member (38, 55, 75) cooperates with a second valve seat surface (40, 56) in the valve seat body (32, 50) forming a second sealing seat (41, 57). The valve needle (34, 51, 73), or the first valve closure member (35, 52), has a limit stop, against which, after a partial stroke (h1) of the valve needle (34, 51, 73), a counter limit stop of the second valve closure member (38, 55, 75) strikes. This lifts the second valve closure member (38, 55, 75) from the second sealing seat (41, 57) in response to a further stroke of the valve needle (34, 51, 73).

EP 0 978 649 A2

This patent teaches a nozzle body (12) with a tip (10) with two axially separate rows of injection holes (14,16). A nozzle needle (20) is axially movable in the nozzle body, whereby a conical surface (22) on the needle tip selectively frees and blocks the fuel path to the injection holes. A protruding insertion body (30) on the needle tip moves axially with respect to the needle. In the closed state the conical surface is in contact with the first, upper row (14) of injection holes on the inside of the tip and a wedge body (32) is in contact with the inside of the tip between the rows of holes. After raising the conical surface to free the

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fuel path to the first row the wedge body frees the fuel path to the second, lower row (16) of holes.

WO 02/18779 A1

This patent teaches a method for controlling the opening and closing process of the nozzle needle (7) of an injection valve, comprising a control valve (3). A rapid operation of the nozzle needle (7) with concomitant low leakage may be achieved. Pressure in the control chamber (7) is generated which acts upon the nozzle needle (7) in addition to the pre-tensioning of the spring (10) to close the nozzle needle (7). For opening the nozzle needle (7), the additional pressure acting on the nozzle needle (7) is released.

DE 41 15 457 A1

This patent teaches an injection nozzle for internal combustion engines that matches injection hole cross-sections to the actual running conditions of the engine. The nozzle incorporates a hollow needle controlling a first group of injection holes. Inside the hollow needle (6) a fitted concentric inner needle (17) is loaded in the direction of its closure position by a second spring (18). In order to match the injection cross-section to the actual engine running state, a shoulder (22) is provided on the hollow needle (6) which works in conjunction with a heel formation (21) on the inner needle (17). In the closure position of both needles, a clearance is provided between the shoulder and the heel formation, and an adjustable stop is available for one of the two needles. In one position, the stop permits a movement (h) of the needle which is less than the clearance between the shoulder and the

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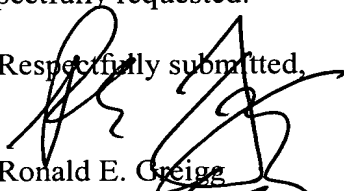
heel formation. In a further position of the stop, the needle movement is greater than the clearance between shoulder and heel formation.

DE 101 18 699 A1

This patent teaches a fuel injection device (10) for internal combustion engines, comprising an elongated housing (12) with a closed injection end (28). A recess (34) extends within the housing (12) in the longitudinal direction and can be linked with a fuel inlet (20). At least two axially spaced apart outlet openings (30, 32) are provided on the injection end (28). At least two coaxially and axially movable valve elements (40, 42) are disposed in the recess (34) and cooperate with valve seats in the area of the outlet openings (30, 32). The valve elements (40, 42) comprise a driving connection (52, 72) which allows the one valve element (40; 42), when traveling a certain path (S1), to axially contact the other valve element (42; 40), thereby taking it along. This allows for a fuel injection device (10) that is as simple and small as possible in design.

Examination of this application is respectfully requested.

Respectfully submitted,


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